February 19, 2019

HR2W
Attn: Carolina Balazs
Office of Environmental Health Hazard Assessment
1515 Clay Street, 16th Floor
Oakland, CA 94612
Sent via electronic mail to: https://oehha.ca.gov/water/comments/comment-submissions-human-right-water-california

Re: comments on Draft Framework and Tool for Evaluating California's Progress in Achieving The Human Right to Water

Dear Dr. Balazs,

Thank you for the opportunity to comment on the draft report, *A Framework and Tool for Evaluating California's Progress in Achieving the Human Right to Water,* published January 2019.[1] The undersigned groups laud the effort of the Office of Environmental Health Hazard Assessment (OEHHA) to evaluate California's progress on the Human Right to Water. A systematic approach to documenting current problems and tracking progress over time is an essential part of efforts to ensure universal safe, affordable, accessible water and sanitation in California. In order to better secure the Human Right to Water for all Californians, we see a need to: (1) be able to more rigorously and systematically identify and address existing

[1] Carolina Balazs, John B. Faust, Jessica J. Goddard, Komal Bangia, Emilie Fons, and Molly Starke. "A Framework and Tool for Evaluating California's Progress in Achieving the Human Right to Water." CA OEHHA, January 2019. https://oehha.ca.gov/media/downloads/water/report/hr2wframeworkpublicreviewdraft010319.pdf.

emergent drinking water situations; and (2) more proactively identify vulnerabilities in order to head off future drinking water challenges before such challenges reach a crisis status.

As an initial matter, we are deeply concerned that the draft framework restricts its evaluation of the Human Right to Water to community water systems. We understand that these systems provide significantly more data for development of the tool. However, neither the Legislature (in adopting Water Code 106.3) nor the State Water Board (through Resolution 2016-0010) indicated that the Human Right to Water should be viewed through such a narrow lens. Rather, section 106.3 specifically states that "every human being has the right to safe, clean, affordable and accessible water adequate for human consumption, cooking and sanitary purposes."

The focus in the draft on community water systems will likely perpetuate many of the problems that the Human Right to Water legislation were intended to address namely, ignoring issues simply for lack of measurement. It leaves out roughly 400 schools that are served by their own non-transient, non-community water systems; 1.5-2 million people not served by a community water system; California's significant homeless population; and all Californians served by failing sewer and septic systems.

We see the goal of the first edition of this framework as measuring drinking water service delivered by Community Water Systems (CWS). We recommend that OEHHA more clearly articulate that drinking water service for CWS be regarded as part of a broader framework that measures drinking water and sanitation service universally. We provide feedback in greater detail below; however, our overarching recommendations for this edition of the framework are that 1) The significant data gaps listed above are identified more prominently in the document, with recommendations for remedying those gaps; 2) The indicators are couched in terms of individuals impacted rather than water system performance; 3) Improvements be made to the Accessibility and Affordability indicators to more accurately measure those aspects of service as defined in the document; and 4) The tool address the discrepancy between Public Health Goals and Maximum Contaminant Levels in the Quality component. Once these four items are addressed in the framework, we encourage OEHHA to release a GIS mapping interface on drinking water service for CWS. In the future, we hope to see the State of California develop a unified set of measurements that address drinking water for those served by state smalls and domestic wells; sanitation service and drinking water and sanitation for institutions such as schools. However, we recognize that measuring drinking water service delivered by CWS is an important first step.

Many of our recommendations, such as a focus on household measurements, addressing data gaps, and acknowledging sanitation as a component of the Human Right to Water were made in Pacific Institute's 2018 report on "Measuring Progress Toward Universal Access to Water and Sanitation in California: Defining Goals, Indicators, and Performance Measures."[2] We refer readers to that report for a more-in depth exploration of many of the ideas in this letter.

[2] Feinstein, Laura. "Measuring Progress Toward Universal Access to Water and Sanitation in California: Defining Goals, Indicators, and Performance Measures." Oakland CA: Pacific Institute, September 2018. http://pacinst.org/publication/measuring-progress/.

Sincerely,

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I. General Recommendations

The following recommendations are based on the premise that this version of the framework will encompass only drinking water service delivered by Community Water Systems. As such, we make recommendations on how to more explicitly address uncovered populations and aspects of service as data gaps.

Explicitly acknowledge the present focus of the framework on Community Water Systems (CWS) in the title. Given that the scope of the framework as presently designed is restricted to CWS, and that it focuses exclusively on system-level indicators, the title of the report should acknowledge those limits. We recommend adding a subtitle, “Phase I. Service Levels Delivered by Community Water Systems in California.” As demonstrated by the popular response to the Water Board’s Human Right to Water Portal, it is too easy for those not immersed in the topic of drinking water to misinterpret a partial estimate of the problem as a

complete, all-inclusive estimate. Acknowledging the limits of the scope of the framework in the title can help forestall some of these misinterpretations.

Focus the framework more precisely on the drinking water service experienced by households and individuals.

Re-focus on a household and individual level: The Human Right to Water intrinsically needs to be measured at the household level and include all people in the state. Measuring the level of service delivered by CWS is useful insofar as it gives a proxy for the quality of service experienced by most people in the state. It also allows inter-system comparisons and identification of systems for needed interventions. However, as international frameworks such as the World Health Organization and United Nations Joint Monitoring Programme have long acknowledged, there is often significant intra-system variation in the service experienced by households. Differences in household plumbing, income, and housing status mean that the human right to water is not always guaranteed by the presence of a well-functioning local CWS. We make recommendations throughout this letter on how the existing framework can relatively easily incorporate measurements that acknowledge the variation between households and individuals located within the service boundaries of CWSs. We also make recommendations on structuring the framework so that it can expand to include uncovered populations such as those served by Very Small Systems (and decentralized wastewater) in the future.

Present results in number of households or individuals, in addition to the number of systems. There are three major benefits to presenting results in number of households/individuals: First, this will allow OEHHA to eventually add in information on those served by domestic wells and homeless to the framework. With the current approach of measuring the number of systems, there is no easy way to add in these populations in the future. Second, presenting results in number of households/individuals weights the system results by population served. Last, measuring households/individuals maintains the focus on the *human* right to water, which should be measured at a fine scale.

Include number of persons experiencing homelessness in estimates of those without accessible or affordable water. Creating a metric that looks at individuals rather than CWS also allows the inclusion of California's homeless population. Being homeless is itself an indicator for a lack of accessible and affordable drinking water and sanitation.[3] Point-in-time counts of homeless in a region are available and should be

[3] See, e.g., Los Angeles Central Providers Collaborative. "No Place to Go: An Audit of the Public Toilet Crisis in Skid Row," June 2017. http://www.innercitylaw.org/wp-content/uploads/2017/07/No-Place-To-Go-final.pdf for a discussion of inadequate access to handwashing facilities as part of public restrooms. Also see Feinstein, Laura. "Measuring Progress Toward Universal Access to Water and Sanitation in California: Defining Goals, Indicators, and Performance Measures." Oakland CA: Pacific Institute, September 2018. http://pacinst.org/publication/measuring-progress/, pp. 35-36, for a review of information on the 2017-2018 Hepatitis A outbreak among the homeless linked to lack handwashing (and toilet) facilities; and p. 40 for a discussion of inadequate public restrooms in California (the main access point to

included in estimates of those with poor access and unaffordable drinking water and sanitation.

Clarify that the Human Right to Water includes sanitation. The report reads as interpreting the Human Right to Water narrowly as a Human Right to Drinking Water. The report throughout should explicitly acknowledge that, as in AB 685, water includes "water for sanitary purposes," including wastewater. For instance, Figure 1, Water Adequacy, covers only drinking water. The definitions of Water Quality and Affordability define these terms solely in terms of drinking water. (pp. 4-5.) We urge OEHHA to use the term Water throughout the report in reference to Drinking Water and Sanitation, and to make it clear that Water is an umbrella term for both essential services.

During our conversations with staff on this draft, we were informed that OEHHA intends to add indicators to evaluate access to adequate wastewater services in future iterations of the framework. We ask that the draft be revised to make that intention explicit, and to note in the introduction that this framework does not presently evaluate access to safe, adequate, and affordable wastewater service.

Include more discussion of what information is needed to truly measure the Human Right to Water, and how to remedy those data gaps. The framework is organized around what can be measured. An equally important question is what should be measured, and how to remedy data gaps so that a more complete set of indicators can be measured in the future.

Expand the discussion on "Additional Groups or Units of Analysis or Topics to Consider and lay out a plan to address very small systems like State Smalls and Domestic Wells." Persons reliant on Very Small Systems, such as State Smalls and Domestic Wells, as well as Non-Transient Non-Community systems and Transient Non-Community systems, are a large missing group. Additionally, institutions such as schools, medical facilities, and group care homes are important access points for water and sanitation. Finally, sanitation is an essential and equal component of the Human Right to Water. Does OEHHA have a plan for how to include these populations and aspects of the Human Right to Water in future versions of the framework?? We encourage OEHHA to work collaboratively with other state agencies to lay out a plan to address these gaps. While we realize the framework is not intended to be all-encompassing at this stage, it is important to construct the framework in a way that allows it to expand.

We appreciate the effort to include missing data for system service as an indicator in the framework for water quality and recommend also explicitly measuring missing data for each of the other components as well. Missing data can mask poor-quality service and should be considered a flag for potential problems in a system.[4] Tracking missing data can also

water for persons experiencing homelessness).

[4] e.g. see Marcillo, Cristina E, and Leigh-Anne H Krometis. "Small Towns, Big Challenges: Does Rurality Influence Safe Drinking Water Act Compliance?" AWWA Water Science 1, no. 1 (2019): e1120. Authors

prevent unintentionally incentivizing poor reporting by systems. Water Quality Indicator 4: Data Availability is important in addressing these problems. During our conversations, OEHHA staff indicated that fewer than half of CWS provided rate information in the Water Board eARs. We also are aware that much of the information on vulnerability to water outages, institutional vulnerability, and indicators of poor access are incomplete. Given the pervasive problem of incomplete data, it would be an extremely useful addition to actively track missing data for all components of the framework.

Pursue inter-agency alignment on defining indicators and measuring progress on the Human Right to Water. Several state agencies (California Department of Water Resources, State Water Resources Control Board, and Office of Environmental Health Hazard Assessment) are engaged in defining indicators and measuring progress on drinking water (and, to a lesser extent, sanitation) in California. Department of Water Resources (DWR) has presented metrics for Public Health and Safety in their draft Water Plan 2018, and DWR is also developing supply vulnerability indicators for small community water systems and Very Small Systems[5] through their County Drought Advisory Group. The State Water Resources Control Board (Water Board) has presented indicators of safe drinking water on their Human Right to Water Portal and has stated an intent to expand that website to include affordability and access. The Water Board is also engaged in developing indicators for failing Community Water Systems, state small water systems and domestic wells in their Drinking Water Needs Assessment.[6] Ultimately, the Governor's office should allocate responsibilities between the three agencies. We would suggest the following divisions of responsibilities:

- OEHHA should focus their efforts on measuring safe drinking water (including affordability and accessibility, although with the caveat noted below) from the public health perspective.
- OEHHA should actively identify areas where critical data is missing and work with the State Water Board to develop a plan for obtaining this data and integrating it into future assessments.
- Water Board should assess Safe Drinking Water Act (SDWA) compliance, Technical, Managerial and Financial capacity (TMF), access, and affordability.
- The Department should assess water supply vulnerability for both public water systems and state small water systems/domestic wells.

The Drought and Institutional Vulnerability Indicators (Accessibility Indicators 1, 2, and 3) are not measures of access currently or recently experienced by the customers, and as such should be moved to a different portion of the framework. Access should measure sufficient quantity, continuous availability (over years and throughout the day), and collection

make the point that small systems have more monitoring and reporting violations of the Safe Drinking Water Act (SDWA), whereas medium systems have more health-based SDWA violations. They argue that this is likely a result of small systems failing to report and monitor properly, masking their true rate of health-based violations.

[5] We refer to all water systems serving fewer than 15 connections or 25 persons year-round as Very Small Systems. This includes State Small Systems and domestic wells or surface diversions.

[6] The Water Board Drinking Water Needs Assessment is described at https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/needs.html.

distance and time, as experienced by individuals/households at present or in the recent past. In the present draft, the Drought and Institutional Vulnerability indicators are an attempt to predict the likelihood of a failure to deliver safe, affordable, accessible water in the near future. This set of indicators would better be described as a fourth, separate component of the framework, as discussed below. It would be a misleading to use measurements of likely future failures to assess current or recent access experienced by the customers.

The report would benefit from a more refined set of indicators on drinking water access and affordability. The water quality indicators are quite thorough, taking into consideration many dimensions of water quality: known contaminants, unknown quality problems (i.e. data gaps), duration of exposure, and so forth. By comparison, the indicators on access and affordability are single-dimensional, not measuring every aspect of the components as they are defined on pages 4-5 of the report.

All indicators and composite scores described should give a numeric formula for how they are calculated from the variables measured. The existing descriptions are qualitative in nature, identifying the factors in the quantitative indicators, but not how those factors are converted to a single number. For example, "Water Accessibility Indicator 2: Institutional Capacity" is intended to convert system size and economic resources to a single numeric score. But how is the mathematical operation performed? For the reader to fully evaluate the framework, the report needs to provide the formulas for calculating indicators and composite scores.

Clarify the planned deliverables for the tool and an update schedule. What information will be provided by the framework and tool? How often will the framework and tool be updated?

II. Recommendations on improving specific indicators included in the framework

Water Quality

This section could benefit from greater information about how the indicators are calculated and scored. We understand that more information is forthcoming on the method of scoring water quality. This will help our understanding of how all the indicators work. We look forward to providing more specific comments when that information becomes available.

Data availability. While we appreciate the inclusion of a data availability indicator, we think its parameters don't sufficiently identify sources of uncertainty in the water quality evaluation. For instance, lead testing is conducted by public water systems on a very limited basis and is intended to demonstrate system performance rather than public health exposure. The report should acknowledge the significant underestimate of lead exposure resulting from this testing

protocol. Additionally, the report could consider inclusion of testing data from public school taps that is currently underway.[7]

Next, while there is a serious lack of water quality data for state small water systems and domestic wells, some information is available through programs such as the USGS GAMA shallow aquifer monitoring program, the Central Coast Irrigated Lands Program domestic well testing program, and the Monterey County state and local small system well testing program. Future iterations of this report should consider how this, and other information can be utilized to provide a more comprehensive evaluation of water quality.

As mentioned, above, the lack of information about water quality at the tap for most consumers is an enormous concern. In particular, areas with high levels of secondary contaminants, old housing stock and high concentrations of low-income households, should be identified as areas where greater investigation of water quality and water quality parameters is needed.

Finally, contaminants for which standards are under development — such as hexavalent chromium or other unregulated contaminants — should be, at a minimum, identified as a source of uncertainty, with data to be included in future iterations of the draft framework.

Selection of Contaminants. This section limits review of contaminants to those for which at least 80% of community water systems reported at least one monitoring sample, plus 4 contaminants linked to significant health effects. Can you explain in more detail why this limitation was thought to be necessary and what impact it has on the number of households identified as impacted?

Also, how can this report address contaminants for which standards are being developed and/or revised? Specifically, we have significant information about the hazards of hexavalent chromium and where it has been found, but for purposes of this report it only exists in a footnote. That results in an undercount of Californians without safe drinking water.

This feeds our more general concerns about the reliance on primary drinking water standards for this indicator. At a minimum, the authors should consider broadening the scope of the "non-compliance" indicators to include contaminants for which a Public Health Goal has been established as well as violations of secondary contaminant standards.

The two indicators under Water Quality, Exposure and Non-Compliance need more discussion. Exposure should measure health impact from the contaminants such as acuteness, duration and frequency of exposure. Compliance is an important measure, but more of a measure of TMF. Since OEHHA separated Compliance from Exposure, reporting and monitoring violations should factor into the compliance ranking.

[7] https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/leadsamplinginschools.html

Exposure sub-component. Calling this indicator "exposure" is not accurate as it implies this is what households are drinking at the tap. As noted in the report, testing results are at the well or treatment facility, not at the tap. Any contamination introduced by distribution networks or premise plumbing is thus not measured. MCLs are generally measured at the source, not the tap. Is there a better way to measure contaminants at the tap? This is important for systems with multiple sources of water

Approach. This sub-component should include some discussion of the population affected by monitoring violations. We know that reporting of water quality data varies greatly according to the size of the systems and are concerned that the underreporting of data also results in the under-reporting of impacts. Additionally, some analysis of treatment technique violations would be appropriate, as we know that such violations can have water quality impacts at the tap.

Use Public Health Goals (PHGs). As the agency responsible for researching the health impacts of drinking water contaminants and for establishing PHGs, we strongly recommend that OEHHA rely on its own expertise to identify health exposures for drinking water contaminants, rather than relying on Maximum Contaminant Levels (MCLs) which do not have the same direct link to health outcomes. This will allow analysis of the potential health impacts of cumulative exposure to multiple contaminants in drinking water. We acknowledge that there is a limitation when a Detection Limit for Reporting (DLR) is above the PHG, but we think this should be addressed by using either the higher value of either the PHG or DLR rather than the MCL, for calculation of the Exposure indicator. Specifically, for the Exposure indicator,

if MCL≥DLR>PHG, use DL;
if MCL≥PHG>DLR, use PHG.

We appreciate the inclusion of the duration of water quality problems. We also appreciate acknowledging the impact of blending of multiple water sources that could have good and bad results and how reporting of all sources is important. The paper could benefit by making a statement that more research is needed on the synergistic health impacts of multiple contaminants.

Non-compliance subcomponent

As noted above, we think the compliance indicator should consider all violations, including monitoring/reporting and secondary contaminants. In particular, ignoring secondary contamination ignores its impact on the public's willingness to drink their tap water and the likelihood of shifting reliance to sugary beverages, with the negative health impacts that that brings.

Should Total Coliform Rule violations be considered a factor for water quality, even when they are not *e. coli*? We're concerned by the treatment of the total coliform rule, which seems to be a result of the delay in the state update of the standard rather than the actual impact of violations. We appreciate it being called out as part of Water Quality indicator #2, but we know that TCR violations - even without E.coli or fecal coliform detections - can also be an indicator of

poor Technical, Managerial, and Financial capacity. Additionally, it would be helpful to understand how the Revised coliform rule, to be implemented in 2019, will fit into reporting/scoring and how the revised rule will be used to assess past violations.

Water Accessibility

With respect to water accessibility, the draft report states the following goal: "Water should be easily accessible in sufficient and continuous amounts to meet everyday household needs. For example, it should be available for drinking, preparing food, bathing, clothes washing, household cleaning, and toilet use." (p. 5.) We agree generally with this goal, though would modify the goal to state that "water should be easily accessible to **every human being without discrimination**..." This is both to clarify that all people are included in the framework (regardless of, e.g., immigration status or whether a person is experiencing homelessness), and to better parallel the Human Right to Water Statute (Water Code § 106.3). We also believe that the goal should include access to both hot and cold water, piped into the home.[8]

On a similar note, we ask that OEHHA include indicators related to accessibility at the household level to capture disparities in access between end-users. The draft report notes that the "current framework focuses on system-related characteristics that may impede access to reliable and adequate water supplies, especially during times of severe stress." (p. 18.) The implication of this statement — that OEHHA may update this framework to include household-level indicators at some point in the future — is consistent with our discussions with staff.

However, there is data on household-level access to water that could be incorporated now. For example, the American Community Survey includes data on whether households have access to hot and cold running water and a sink with a faucet. Further, service disconnections impact access on a household level, and data on disconnections is available through the American Housing Survey and Water Board electronic Annual Reports. OEHHA should also factor in those experiencing homelessness within the boundaries of a water system, under the valid assumption that those experiencing homelessness likely also lack access to adequate drinking water and wastewater services.

On the topic of system-wide water outages, we think the Access component should focus on measuring recent shortfalls in supply that resulted in a water system's inability to deliver the volume of water necessary for domestic needs. Data on outages, shortfalls, and mandatory rationing are collected in the Water Board electronic Annual Reports for Large and Small Systems under System Problems and Water Conservation and Drought Preparedness.

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[8] *See*, e.g. Feinstein, Laura. "Measuring Progress Toward Universal Access to Water and Sanitation in California: Defining Goals, Indicators, and Performance Measures." Oakland CA: Pacific Institute, September 2018. http://pacinst.org/publication/measuring-progress/. ["Water should be available in the home, in sufficient volumes to meet domestic needs, at hot and cold temperatures, at the times needed."].

Turning to institutional and physical vulnerability, and as described more fully below, we strongly support OEHHA's decision to analyze the likelihood that a water system may fail in the future. However, both due to the expansion of the accessibility indicators recommended in this section, and because we see vulnerability to failure in the future as separate from indicators regarding current accessibility deficiencies, we recommend that these indicators be moved to their own component of the framework, as discussed below.

Water Affordability

Fundamentally, and as now documented in multiple analyses, a system level-approach to measuring affordability is inadequate. Even more so than for quality and accessibility, affordability needs to and can be measured at the household (or customer) level. The reason for this is that affordability is best measured as a function of both the price of water charged by a water system for necessary household uses and the available household financial resources to purchase this amount of water. The full range of reasons for the focus on the household scale of analysis are detailed in the State Water Board's recent draft report "Options for Implementation of a Statewide Low-Income Water Rate Assistance Program"[9] but have also been articulated by several other scholars.[10]

Accordingly, we appreciate that OEHHA has incorporated two indicators (#2 and #3) which focus on the price of water as a share of disposable income for low-income households. We recommend, however, that the median household affordability indicator (#1) either be moved to #3 or removed entirely.

Moreover, we suggest changing the calculations of affordability indicators #2 and #3 not to gauge whether the price of a certain quantity of water charged by the system is higher or lower than a binary threshold, but rather provide an estimate of the number of households unable to afford the water served by a given water system.

Finally, we would appreciate more detail on OEHHA's plan to fill in missing data on water rates, which are lacking for a wide swath of systems. How is missing data on water rates envisioned to be addressed? OEHHA should either actively aim to supplement missing rate data by collecting directly from systems as other rate comparison efforts have attempted. Or, as an alternative or supplement to this approach, missing rate data should be incorporated into the affordability indicator as a factor of concern, as is already done for the quality indicator.

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[9] CA State Water Resources Control Board (2019). "Options for Implementation of a Statewide Low-Income Water Rate Assistance Program." See https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/assistance/docs/2019/draft_report_ab401.pdf

[10] For instance, see Teodoro, Manuel P. "Measuring Household Affordability for Water and Sewer Utilities." *Journal-American Water Works Association* 110, no. 1 (2018): 13-24; Feinstein, Laura. "Measuring Progress Toward Universal Access to Water and Sanitation in California: Defining Goals, Indicators, and Performance Measures." Oakland CA: Pacific Institute, September 2018. http://pacinst.org/publication/measuring-progress/.

System Vulnerability

As noted above, we recommend moving the water outages and institutional vulnerability indicators (Accessibility Indicators 1, 2, and 3) out of the Access component, because they do not measure current or recent access. The purpose of the three vulnerability indicators is to predict likely future failures to provide safe, affordable, accessible water service by a system. Predictors of future problems should not be calculated in the Access score.

The drought and institutional vulnerability indicators are distinct from the other indicators in the framework because they are intended to predict future water service. As such, the relationship between the indicators and subsequent performance in other components should be validated statistically, and the results used to refine and improve the system vulnerability indicators.

With respect to the water outages indicator, we agree that vulnerability to outages on a system level is important to ensure future access. Our organizations work directly with or advocate for communities that have experienced water shortages during the recent drought. Developing a framework to predict what systems are vulnerable to outages, either during drought or otherwise, will be critical to proactively addressing problems before they become a public health crisis.

On the other hand, the focus on the existence of backup supplies as an indicator of vulnerability to drought likely overlooks risk of outage to some systems. For example, Tooleville is a small disadvantaged community in Tulare County that is served by a water system with two groundwater wells, both of which are "open bottom" wells drilled to just over 300 feet. However, though the community is served by two active wells, the second well is rarely used because the pump is unreliable and the well produces low quantities of water. Though the second well in Tooleville may make the water system slightly more resistant to outages and drought, the system is by no means drought resistant. If the primary well were to fail, the community would likely be facing an immediate crisis.

We recommend that, in addition to the number of wells, OEHHA look to other indicators of vulnerability to outages on the system level, including; well depth versus depth to groundwater, well construction, and age of the well and pump. Additionally, OEHHA should calculate and incorporate a predicted production to demand ratio in average years and droughts lasting one, three and five years. The data needed to incorporate these indicators is already available or could be collected with reasonable efforts.[11] We also recommend that in implementing and

[11] The American Community Survey (ACS) Public Use Microdata Samples (PUMS) has data on whether homes have hot and cold running water and a sink with a faucet in the kitchen and bathroom. For the future, when sanitation is included, ACS PUMS (through 2015) has data on toilets as well. American Housing Survey includes information on household wastewater connections. Feinstein (2018) has a full discussion of statutory and regulatory requirements and data sources on household plumbing. On supply and demand of water: The Water Board's electronic Annual Reports for Small and Large suppliers collect

updating the physical vulnerability indicators, OEHHA collaborate with the DWR County Drought Advisory Group.

III. Conclusion

The Human Right to Water is an essential service for people to live healthy, productive lives. Actively tracking problems in a centralized, statewide repository is vital to identifying problems and proactively resolving gaps in service. We look forward to continuing to work with OEHHA on this effort.

a wealth of information on water conservation and drought preparedness. Some particularly useful questions cover volume of water produced and delivered, as well as past shortages. For large systems, Urban Water Management Plans contain data regarding supply, demand and shortage contingency planning. Data regarding service deficiencies is also included in city, county and LAFCo analysis pursuant to SB 244.